

Claims

- sub E1
1. A method of cutting a workpiece made of stainless steel, coated steel, aluminum or aluminum alloy by the use of at least one transparent or reflecting optical means for focusing at least one laser beam and of at least one assist gas for said laser beam, in which the optical means is of the multifocus type and the assist gas is oxygen or an oxygen/nitrogen mixture.
2. The method as claimed in claim 1, wherein the multifocus optical means is chosen from lenses, mirrors and combinations thereof, preferably a bifocal lens.
- A 3. The method as claimed in ~~either of claims 1 and 2~~ <sup>claim 1</sup>, wherein the assist gas is an oxygen/nitrogen mixture containing at least 90% nitrogen, preferably from 92 to 98% nitrogen.
- A 4. The method as claimed in ~~one of claims 1 to 3~~ <sup>claim 1</sup>, wherein the assist gas is oxygen containing less than 500 ppm by volume of argon as impurities, preferably less than 100 ppm by volume of argon.
- A 5. The method as claimed in ~~one of claims 1 to 4~~ <sup>claim 1</sup>, wherein the assist gas is a nitrogen/oxygen mixture having an oxygen content greater than 0% by volume and less than 8% by volume, preferably an oxygen content between 150 ppm by volume and 5% by volume, the rest being nitrogen.
- A 6. The method as claimed in ~~one of claims 1 to 5~~ <sup>claim 1</sup>, wherein the optical means is arranged so as to obtain at least one first focusing point positioned near the upper surface of the workpiece to be cut, preferably so as to coincide with said upper surface, or in the thickness of the workpiece to be cut in a region close to said upper surface, and at least one second focusing point positioned near the lower surface of the workpiece to be cut and in the thickness of the latter, or beyond the latter.
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7. The method as claimed in ~~one of claims 1 to 6~~,<sup>Claim 1</sup> wherein the thickness of the workpiece to be cut is between 1.5 mm and 5 mm.

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8. The method as claimed in ~~one of claims 1 to 7~~,<sup>Claim 1</sup> wherein the workpiece to be cut is chosen from plates, sheets and tubes.

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9. The method as claimed in ~~one of claims 1 to 8~~,<sup>Claim 1</sup> wherein the nitrogen/oxygen mixture is obtained directly on the site of use from atmospheric air treated by a membrane system.

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10. An apparatus for cutting a workpiece made of stainless steel, coated steel, aluminum or aluminum alloy, comprising:

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- at least one laser generator for generating at least one laser beam;

- at least one output nozzle through which said laser beam passes;

- at least one transparent or reflecting optical means for focusing said laser beam; and

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- at least one source of assist gas for said laser beam feeding said output nozzle with assist gas,

wherein:

- the optical means is of the multifocus type, and

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- the source of assist gas feeds the nozzle with oxygen or with a nitrogen/oxygen mixture, preferably containing at least 90% nitrogen.

Add C8

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